

TRANSIT INDUSTRY RESEARCH NEEDS

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This discussion deals in part with the transportation planning and research studies currently under way in San Antonio, Texas. These studies were designed to encompass the type of planning and research that the San Antonio Transit System (SATS) regards as essential to the development of recommendations for an immediate transit improvement program and for our future operations planning.

However, there is also an overriding research requirement that goes beyond the transit system needs of any particular urban region. This requirement is as follows: The need to document the fact that our cities simply cannot be structured to accommodate all the present and future travel and parking demands of persons who use private automobiles, on work trips, during the peak morning and evening weekday travel hours.

This research is needed in order to substantiate the fact that urban freeways, arterial streets, and urban public transit facilities can and must operate in a partnership and that diversion of some peak-hour automobile work trips to improved and expanded urban transit systems is in the best interests of both the community and the motorists themselves.

NEED FOR STATE AND MUNICIPAL AID

A need exists to document the common interest of both the community and the motorist public in expanding peak-hour use of transit services because an increase in transit patronage will require substantial state and local financial assistance. It also will require that transit vehicles be given preferential treatment on downtown streets and on urban freeways, so that they can bypass locations subject to traffic delays.

Public support, particularly the support of motorists, will be necessary for the adoption and strict enforcement of measures to give transit vehicles preferential treatment in traffic operations. Public support will also be needed to persuade state legislatures and municipal governments to provide the special financial assistance required to upgrade and expand transit facilities.

Transit vehicles must receive preferential treatment in street and freeway operations because without such treatment transit ridership cannot be significantly increased.

The very attribute of transit service that qualifies it for a partnership operation with automobile transportation—its ability to carry large numbers of people with a relatively small number of vehicles during periods of heavy traffic congestion—is also the attribute that makes it impossible for transit systems to finance the needed expansion and upgrading of capital facilities without state and local financial assistance.

Because most transit patronage is concentrated in the peak morning and evening weekday commuting hours, neither transit equipment nor manpower can be fully utilized for more than about 20 hours per week.

The manpower-use factor is particularly critical in bus transit operations. With the exception of New York City, transit buses account for 90 percent of all urban transit ridership in the nation, and the vast majority of the cities must rely on transit buses

in future transit expansion programs. Driver wages and other payroll costs generally average more than 70 percent of total bus transit operating costs and will continue to increase in the future.

U.S. DEPARTMENT OF TRANSPORTATION PROGRAMS

A recognition of the partnership role of urban highway and urban transit improvements already exists in the U.S. Department of Transportation (DOT): It is expressed in the joint programs of 2 DOT agencies—the Federal Highway Administration and Urban Mass Transportation Administration (UMTA)—which encourage the use of urban freeways and local downtown streets for improved bus transit operations and which provide financial assistance to local transit agencies for acquiring new rolling stock and other capital facilities.

This recognition also exists in many state highway departments and, of course, in the new state departments of transportation, which are cooperating in DOT transit assistance programs.

Unfortunately, most state legislatures, and many municipal governments, have not yet given similar recognition to the necessity of implementing programs to increase urban transit patronage. These remarks are not meant to be critical. State and local governments have not taken action because the necessity for doing so has not been documented with sufficient clarity and force.

RESULTS OF URBAN TRAFFIC GROWTH IN TEXAS

Travel trends in the larger Texas cities are a good illustration of the problems that have arisen over the past 15 to 20 years because of the total commitment to developing new urban freeways and more off-street parking facilities and the lack of concern with regard to providing new facilities for public transit service.

If the large cities of any state could successfully adapt to an all-automobile passenger transportation system, this would be true of Texas. Although 80 percent of the state's residents now live in urban areas, and half of our residents live in 27 cities having a population of more than 50,000, these areas have exceptionally low population densities, characterized by dispersal of residential areas, employment and shopping centers, and other major activity concentrations.

San Antonio, with a city population of 654,000 and an urbanized-area population of 770,000, has a central-city density of only 3,500 persons per square mile. This is the highest density of any city in Texas. Yet it is only about half the population density of Los Angeles and is less than one-quarter the density of cities such as Chicago, Philadelphia, and San Francisco.

While the state population increased 45 percent in the past 2 decades, motor vehicle ownership increased 125 percent, or nearly 3 times as fast. Texas now ranks second only to California in total motor vehicle registrations as well as in number of cities having a population of more than 50,000.

The Texas Highway Department has done an outstanding job of responding to this rapid growth in motor vehicle use. More than 1,200 miles of new urban freeways have been built since 1950, and a tremendous expansion has taken place in off-street parking facilities in downtown areas, at regional airports, hospital-medical complexes, major shopping centers, universities, office parks, military bases, and at cultural, convention, and sports centers.

During most hours of the day, the freeways handle traffic with greater safety and higher operating speeds than ever before attained. Yet congestion and delays still exist during peak travel hours. Similarly, only a few cities in Texas have been able to keep pace with parking demands in downtown core areas, at airports, and at other major trip-generating locations.

IMPLICATIONS OF TRAFFIC GROWTH FORECASTS

Regardless of what future success our large cities may have in increasing public transit patronage, in Texas or any other state, these cities will become steadily more

automobile-oriented in the future. This will be an inevitable result of the population and employment growth that is taking place in automobile-oriented metropolitan areas.

The 30 largest urban areas of Texas are expected to almost double in population by 1990, from 7.1 to 13.8 million. Urban automobile travel is expected to double in 15 years, creating a need for the continuing development of new urban freeways, major thoroughfares, crosstown arterials, and off-street parking facilities.

It is clearly uneconomic, however, to attempt to add sufficient new capacity to the urban freeway, the boulevard system, or the arterial street network to fully eliminate peak-hour congestion because the extra capacity would be needed for only a few hours each day. Highway officials state that, once the present Interstate and other planned urban freeways are completed within the next 5 years or so, no additional freeways will be built in the more heavily developed portions of existing large cities because of the prohibitive cost.

Similarly, if cities have been unable to meet parking demands in downtown areas and other major trip-generating locations with the extensive parking developments of the past 2 decades, they certainly cannot hope to accommodate a doubling of these demands during the next 15 years.

Even if the parking-space requirements could be met, the capacity of downtown streets and major access corridors would become the limiting factor—as it already is in many of our downtown areas and other locations of heavy parking demand.

TRANSIT'S POTENTIAL AND LIMITATIONS

A realistic appraisal of the potential for increasing urban transit patronage is that the routes are limited to certain major travel corridors and that the patronage consists primarily of morning and evening work trips during peak travel hours. However, these are the very corridors and travel hours in which current automobile traffic volumes create the greatest overloading of city streets and freeways—and in which the prospect of a doubling of traffic over the next 15 years poses a clear threat to the very survival of our established cities. Any help, then, that improved transit facilities can give in reducing the severity and duration of traffic congestion will benefit both the community and all highway users, regardless of the type of vehicle they use.

For example, although motor buses make up only 1 percent of total vehicles entering or leaving the downtown areas of our large Texas cities each day, they account for 15 to 30 percent of all daily person-trips to and from these downtown areas. If this bus ratio increased to slightly more than 2 percent of total vehicles, a 25 to 50 percent decline in peak-hour automobile traffic on downtown streets would result.

Similarly, because about three-fourths of typical downtown parking space demands today are for work-trip parking, anything that can be done to divert some of these work trips to transit vehicles, or to fringe or outlying parking facilities linked to the downtown center by express bus service or other types of high-capacity people-mover systems, will help to keep downtown parking-space demands within manageable levels.

The downtown area would benefit from this sharp reduction in peak-hour traffic congestion and the easing of parking-space demands, but so would those motorists who continued to drive to and park downtown. This is why it is in the self-interest of urban motorists to support programs and measures to promote increased transit patronage during the peak travel hours.

SAN ANTONIO TRANSIT OPERATIONS

The exceptionally low population density of the San Antonio area does not provide a naturally attractive environment for a strong transit operation. Despite this condition, SATS has maintained during the past decade a relatively stable patronage, in excess of 20 million revenue passengers per year, and is one of the few U.S. transit systems that has operated in the black while it has increased its bus-miles of service since 1960. SATS's 25-cent base fare also is the lowest of any city of comparable size.

The need for increased bus service resulted from a 20 percent increase in population of the urbanized area during the past decade. By 1990, the urbanized-area popula-

tion is projected to be about 1.3 million, or 66 percent more than the current total. We, therefore, are in the midst of a substantial expansion and modernization program and are undergoing comprehensive studies of our present operations with the objective of finding approaches to attract new ridership.

The transit system modernization program calls for expenditure of \$7,441,200 through July of 1975, with two-thirds of this cost to be met from a grant from UMTA. This will provide SATS with 157 new air-conditioned buses. By 1975, our fleet of approximately 260 buses will include none that is 10 years old.

The modernization program also includes the construction of new buildings and the acquisition of additional equipment at our administrative and maintenance headquarters, plus installation of a number of attractive bus passenger shelters at key transfer points and other heavy passenger stops.

CURRENT TRANSIT RESEARCH PROJECT

In order to provide guidelines for planning transit improvement programs for the next 5 years, SATS has begun a comprehensive study of its transit operations under a separate project co-sponsored by UMTA.

The research is being conducted by Wilbur Smith and Associates, international transportation engineering consultants. The first phase consisted of an on-bus questionnaire survey of passengers to determine trip origin and destination, trip purposes, walking distances to and from bus stops at each end of the trips, automobile ownership of riders, and various other passenger characteristics. Included in this phase were passenger load counts by hour of day and at specified locations along each transit route as well as bus load and headway counts at downtown cordon boundaries.

A second phase involved interviews of a cross section of residents in local neighborhoods throughout the transit service area to determine why they do, or do not, use the transit service, their normal daily travel patterns, and their basic attitudes concerning transit service.

These surveys have been tabulated and analyzed, and a series of specific recommendations for improvements is now being considered. These recommendations will be discussed in detail with civic, business, and neighborhood groups to seek their reactions and suggestions and to inform them of the transit system's commitment to providing good and appropriate service.

ANTICIPATED RESEARCH OUTPUT

The research has been structured to provide new information to guide evaluation of a number of possible changes in transit service. These include the following.

1. Express service: Some past urban transit studies have indicated that a strong demand exists for express bus service for downtown work trips by suburban residents and for similar service to major employment centers, such as the large military bases encircling San Antonio.

The express buses would pick up passengers in local residential areas or at fringe and outlying parking lots, then travel nonstop to the trip destination, generally using a freeway. On some test routes, the first few stops on the morning inbound trip, and the last few stops in the evening, are the heaviest passenger-loading stops. On such routes, the low-volume intermediate stops might be eliminated. The few riders lost at these stops may be more than offset by increased patronage generated by the resulting higher trip speeds.

2. Reverse commuting: Rapid growth of employment centers in suburban areas points to the possibility of 2-way ridership of buses on particular routes, serving inbound suburban residents on morning work trips, and on outbound trips carrying central-city residents who work in suburban locations. The process would be reversed at night.

3. Crosstown service: Transit trip origin-destination surveys in various cities have indicated that 20 to 25 percent of the transit trips are made to and from locations other than the downtown area and are not related to the central business district (CBD). Such

travel patterns have resulted in requests for additional crosstown routes, which would provide direct service among these particular nondowntown locations. The crosstown service would modify the normal transit route configuration, which requires some riders to make unwanted trips downtown in order to transfer to a route serving their trip destination.

Although we are confident that the current SATS study will provide useful data for evaluating the potential of new crosstown service, I think it should be pointed out that there actually are 3 categories of crosstown transit service already provided in cities where the population is reasonably evenly spread among the various quadrants of the community and where the downtown area is in the approximate center of the urbanized region.

One type of crosstown service involves a transit route that is located well outside the downtown area. It focuses on a major employment center, links it with a number of transit routes, and serves some riders along the crosstown route itself. We have 2 such crosstown lines in San Antonio. They operate only in the morning and evening peak periods, and their main patronage consists of riders who transfer to or from other transit lines.

A second type of crosstown service is provided by through-routing—routes that cross the city from one side to the other and in the process pass through the CBD. In San Antonio we have 28 individual lines hooked up and routed to permit riders to travel from one area of town to another without the need of transferring.

The third type of crosstown service requires that a transfer be made from one line to another within the CBD. We have only 3 transit lines in San Antonio, out of a total of 33, which terminate in the CBD, and the riders having destinations elsewhere transfer to another line in the CBD. In addition to these transfers, of course, riders whose trip destinations are not served by lines that pass through the CBD also transfer downtown or at an outer transfer point more convenient for them.

Crosstown transit service already is provided by 30 of our 33 transit lines. Yet by its very nature, crosstown trip demand that is not already met by no-transfer service will probably always require a transfer from one line to another, either within or outside of the CBD.

Where the outer area no-transfer crosstown patronage demands are of sufficient magnitude to make the service economically feasible, such service probably already exists. However, this will not be known for certain until the results of the transit study are evaluated and analyzed.

In the home-interview portion of the study, travel patterns of motorists on work trips are being plotted into travel desire lines. This could indicate that some additional transit ridership potential exists along routes that do not converge on the downtown area.

4. Outlying park-and-ride facilities: Interviews with motorists who use park-and-ride transit service in a number of cities indicate a preference for locating the parking lots some distance away from downtown (4 or more miles, depending on city size), with nonstop or limited-stop service to downtown.

This suggests that new park-and-ride lots might be located at a number of strategic points along radial freeways or in other major travel corridors in order to "intercept" motorists and encourage them to complete their trips by express bus. To be successful, of course, such facilities must provide both parking and round-trip transit service at a lower total cost than that of all-day parking downtown and with a trip speed faster than that of driving and parking downtown.

5. Public awareness of transit service: Some studies have indicated that many potential transit riders use their cars, or arrange to ride with other car owners, because they are simply not aware of the locations and schedules of the local transit system.

The current San Antonio transit survey is expected to indicate the extent of this lack of awareness of available transit service, which will guide us in taking steps to meet the problem.

PREFERENTIAL TREATMENT OF BUS OPERATIONS

As was stated earlier, significant increases in bus transit patronage can be expected only if buses are given preferential treatment in use of city streets and freeways so that they can bypass locations where automobile traffic is delayed in peak travel hours.

We already have made a small beginning in that respect in San Antonio. An exclusive bus lane is provided on a main downtown street fronting the Alamo Plaza. The street carries one-way traffic, with one curb lane reserved for "wrong way" operation by buses. A virtue of this operation is that motorists, warned by overhead signs and by lane markings, keep out of the bus lane to avoid a head-on conflict with buses. As a result, the enforcement problem takes care of itself.

Another type of preferential treatment (reverse lane) for buses on the expressway is the Shirley Highway experiment in Washington, D.C. This service is growing in popularity and has been extended from 4.5 to 12 miles in length.

The current transit study is reviewing a number of other possible measures to improve bus operations including the following:

1. Reserving lanes on more downtown streets for buses only;
2. Reserving certain downtown streets for exclusive use by buses and taxicabs, permanently or in peak traffic hours;
3. Using electronic controls on buses and at selected traffic signal locations so that signals can be adjusted on bus transit routes to favor bus movements;
4. Metering of urban freeways by traffic controls at selected access ramps to keep the roadways free-flowing in peak travel hours (as is now done on freeways in Houston, Dallas, and a number of other cities around the nation), with buses given special freeway access ramps and preferential lanes on parallel service roads; and
5. Constructing special busways within freeways or on exclusive rights-of-way so that buses can bypass traffic congestion locations.

FINANCING THE NEEDED TRANSIT IMPROVEMENTS

It is generally recognized that fare-box revenues will, at best, meet only operating costs. New sources of financial aid will be required for such capital improvements as exclusive busways, expansion and modernization of bus fleets, and installation of electronic controls to adjust traffic signals to favor bus movements on particular routes.

The Urban Mass Transportation Act of 1970, providing for \$10 billion in federal grants to urban transit agencies during the next 12 years to meet up to two-thirds of capital improvement programs, can go far in modernizing and expanding urban bus fleets—but this will require that both state and municipal governments adopt fiscal programs to cover the required local share of the cost.

Similarly, the Federal-Aid Highway Act of 1970, which authorized use of highway trust fund revenues under certain specified conditions for building exclusive or preferential bus roadways or bus lanes, has a tremendous potential, if state highway departments give it more than token implementation.

Justification for use of both federal and state highway tax revenues for such special bus facilities lies in the fact that increased use of buses can very substantially reduce the need for additional highway expenditures to increase peak-hour roadway capacity.

RESPONSIBILITY OF TRANSIT INDUSTRY MANAGEMENT

In the final analysis, it is up to transit industry management officials themselves to take the leadership in capitalizing on the new opportunities now emerging.

We need to tell our story, and tell it clearly and convincingly, to our local governmental, business, and civic leaders; state and local highway officials; state legislators; and state and local automobile clubs, trucking associations, as well as the automobile and petroleum industry organizations and other groups that have a natural and very proper interest in sound highway development and financing.

We will be better able to tell this story if the overriding research need previously mentioned is met. When this need is met, the required support for implementation of transit improvement programs should not be difficult to generate.

The results will be that vehicles will serve the city rather than the city serving the vehicles, that city streets and urban freeways will serve more person-trips and in fewer vehicles, and that both the severity and the duration of traffic congestion will be substantially lower than without these transit programs.

Both the community and the highway users—whether they be riding in automobiles, trucks, or buses—will benefit. Therein lies the basis for a partnership between the transit and highway interests.